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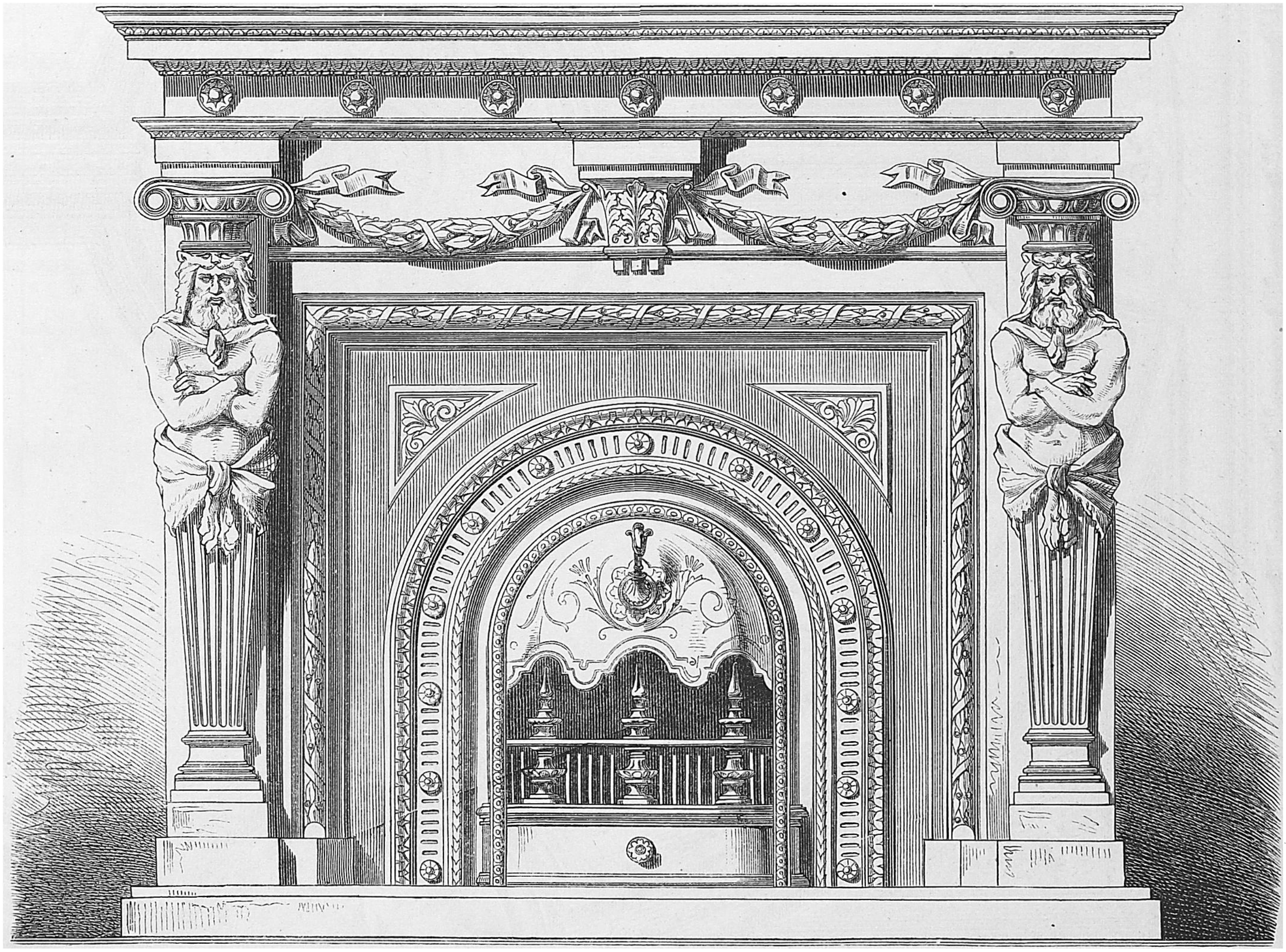
FROM THE VIENNA EXHIBITION.



No. 26. Chimney-Piece in Marble, with Fittings in polished Steel and Bronze Ornaments, designed and manufactured by Messrs. E. Wille & Co., Berlin.

VARIOUS.

THE SAND-BLAST PROCESS.

A stream of sand is introduced into a rapid jet of steam, so as to acquire a high velocity, and is then directed upon any hard substance so as to cut or wear away its surface. For cutting stone, a jet of from 60 to 120 lbs. pressure is used. The sand is introduced by a central tube of about $^1/_8$ inch bore, and the steam issues from an annular passage surrounding it. The steam drives the sand through an iron tube $^3/_8$ inch bore and 6 inches long, and the sand strikes upon the stone which is held at certain distances according to the depth of the cut required on the surface to be operated on. This iron tube will last about 10 hours, being worn away by the sand, but it is easily replaced.

To obtain ornaments on stone, a stencil of iron or caoutchouc is fixed on the stone and the sand-jet moved evenly over the whole surface, so that all the exposed parts may be cut to the same depth. A stencil of cast iron $^3/_{16}$ inch thick will make 100 cuts $^3/_{16}$ inch deep in marble, and will be worn down to about $^1/_{16}$ inch thickness, while one of vulcanised Caoutchouc about $^1/_{16}$ inch thick exposed to sand driven by 50 lbs. steam at 2 feet distance will show scarcely any wear while 50 cuts are made in marble, in all 200 times the thickness of the caoutchouc.

To cut a level surface on a tough stone, the sand jet is made to cut a groove about 1 inch deep along its whole length; the edge is then broken off and the jet advanced an inch, and a new groove cut and the process continued. To cut a deep channel, two jets are used about 3 inches apart, leaving between them a narrow tongue of stone to be broken off, and the jets advanced as before.

Sand driven by an air-blast of the pressure of four inches of water will depolish the surface of glass in ten seconds. If the glass is covered by a stencil of paper, or by a design drawn in any tough elastic substance, a picture will be engraved on the surface. Photographic copies in bi-chromated gelatin from line engravings, have been thus faithfully reproduced on glass, the half tones or gradations of light and shade being successfully preserved.

The sand-blast invented by B. C. Tilghman, London, has been applied to cutting ornaments in wood, cleaning metals and the fronts of buildings, graining or frosting metals, cutting and dressing mill stones, and a variety of other purposes.